Project Title: Education Assignment Dashboard

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Category: Web Application

ABSTRACT

The main motive behind developing this "Education Assignment Dashboard" was to solve the perpetual problem that the students and professors have to face while dealing with Assignments. Assignments form an intrinsic part of the college coursework by helping students in critically analysing as well applying the concepts of the classrooms, in real life.

The absence of an indigenous platform, solely dedicated to handling all the issues related to assignments, leads to a lot of chaos and confusion at the time of submission as well as evaluation. Most of the time, students remain unaware of either the deadline or the mode, and the platform of submission. For the professors, the task of evaluating the assignments becomes very difficult due to the lack of an organised mode of submission. Sometimes, they are required to scan through hundreds of mails in order to evaluate the assignments one by one.

And the biggest issue is the lack of transparency in the marks obtained in the assignments. Marks are sent either by mailing all the students individually, which happens rarely as it is a very tiresome job, or by sending the cumulative marks of all the students in one mail, many students are uncomfortable with this process.

Hence, through our project, we aimed at simplifying the process of allocating, submitting, tracking, and evaluating these assignments.

INTRODUCTION-

Introduction contains the following sub categories -

Existing System

The present system concerned with handling assignments in our college is Piazza, which is a learning management system which enables students to post their queries in a forum type form. It enables the students to accumulate virtually to ask questions directly to their instructors. For the professors, Piazza comes up with the features of posting slides,resources and assignments online. The provision of students submitting their assignments online is also available in Piazza.

Then the question arises that if such a system already exists, why did we make an Education

Assignment Dashboard?
We executed our plan on making an Assignment Dashboard because there were certain incompetencies Piazza due to which it has been unable to provide a complete solution to the problem of online assignment submissions in our college and henceforth we mostly have to mail our assignments .

SCOPE

It will create a coherent platform between the professors and their students to solve all the issues related to assignments. The Dashboard will contain the various details of importance related to all the assignments which the professor may wish to give to the students. Apart from posting the question and recording the solution, the dashboard would also enable the professors to evaluate the answers of the students as well as allot the marks. Students would also be able to analyze their evaluated solutions and this will fetch them ample time to work on their weaknesses. It will integrate well with a result portal that will fetch the marks of the assignments and compute it in the overall score obtained by the students in any course. This will provide more flexibility in the existing learning platform structures and will also become an essential feature in the modern world aiming to adopt modern methods of learning.

Advantages for Student

Advantages for the students are explained below:

- **Transparency in marks:** For students they would know marks obtained and they could see their mistakes and scope for improvement.
- **Integrated environment for assignments**: All the information related to each and every assignment will be present on the dashboard. There won't be any need to switch to multiple platforms in order to view, submit, or analyse the assignments.
- **Privacy:** Students will get to know only their marks safeguarding their privacy.

Advantages for Faculty

Advantages for the professors are explained below:

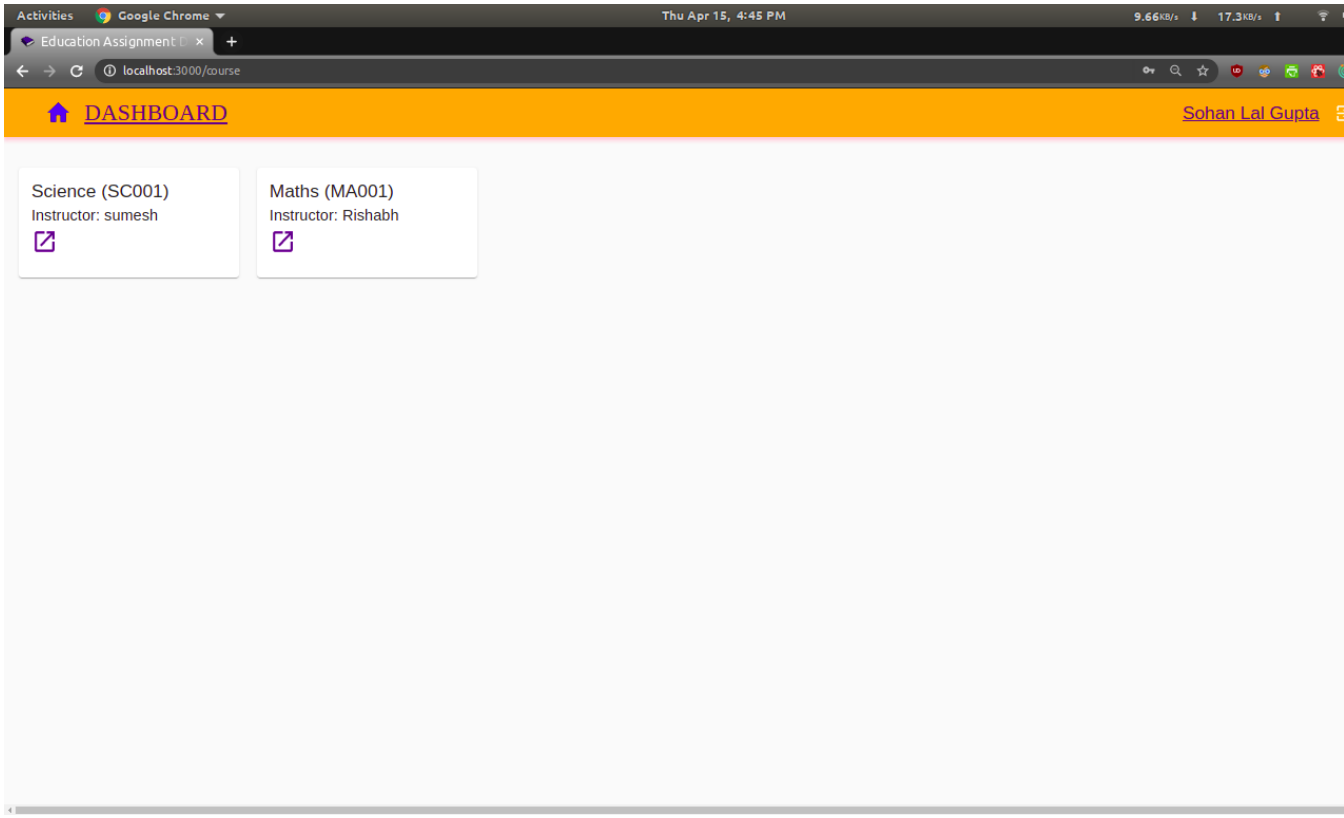
- **Minimising time wastage :** There would be no need for the professors to communicate via emails for any matter relating to assignments.
- **Efficient evaluation:** There would be no need to go through bulk mails of over a hundred

students in order to retrieve each and every individual response.Hence the work of evaluation would be less tedious.

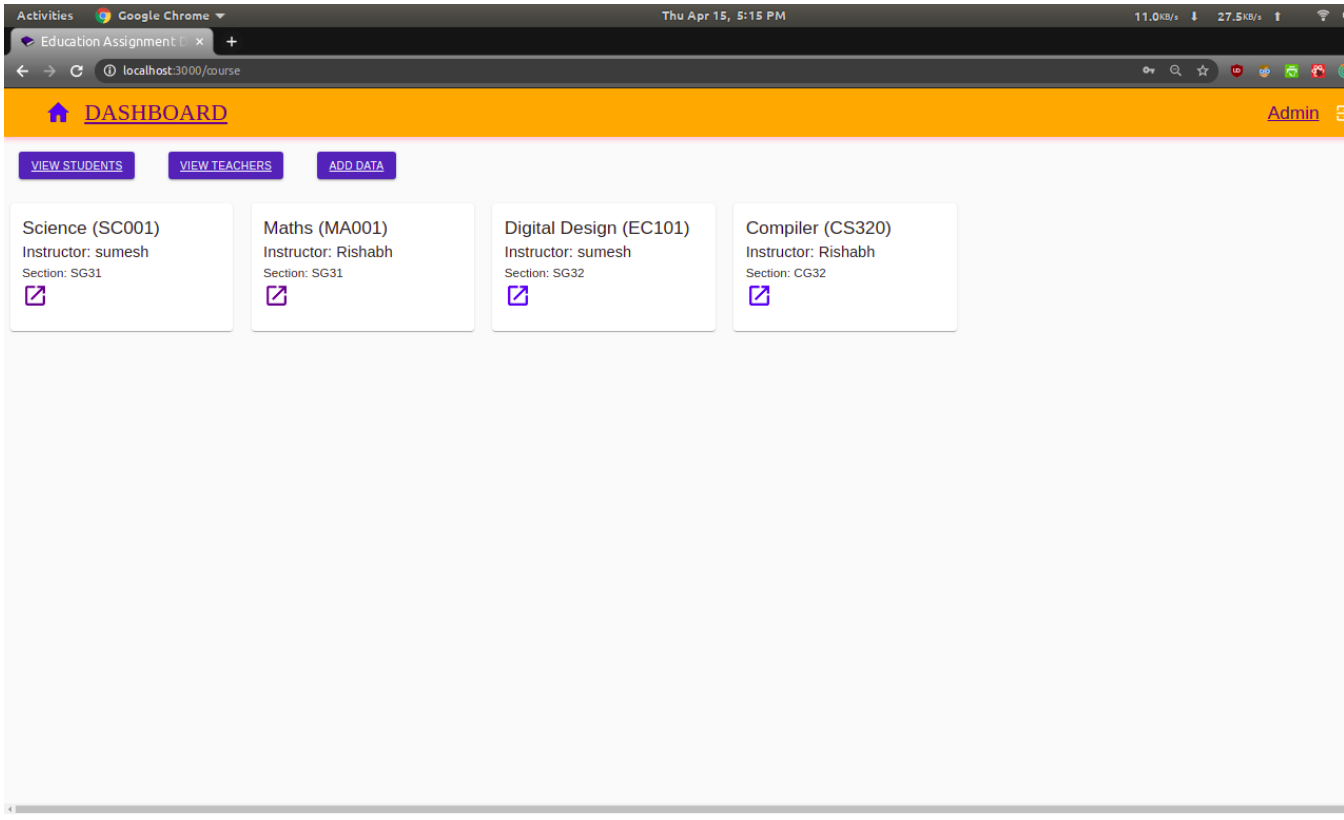
FUNCTIONAL REQUIREMENTS-

Functional requirements of our system are explained below.

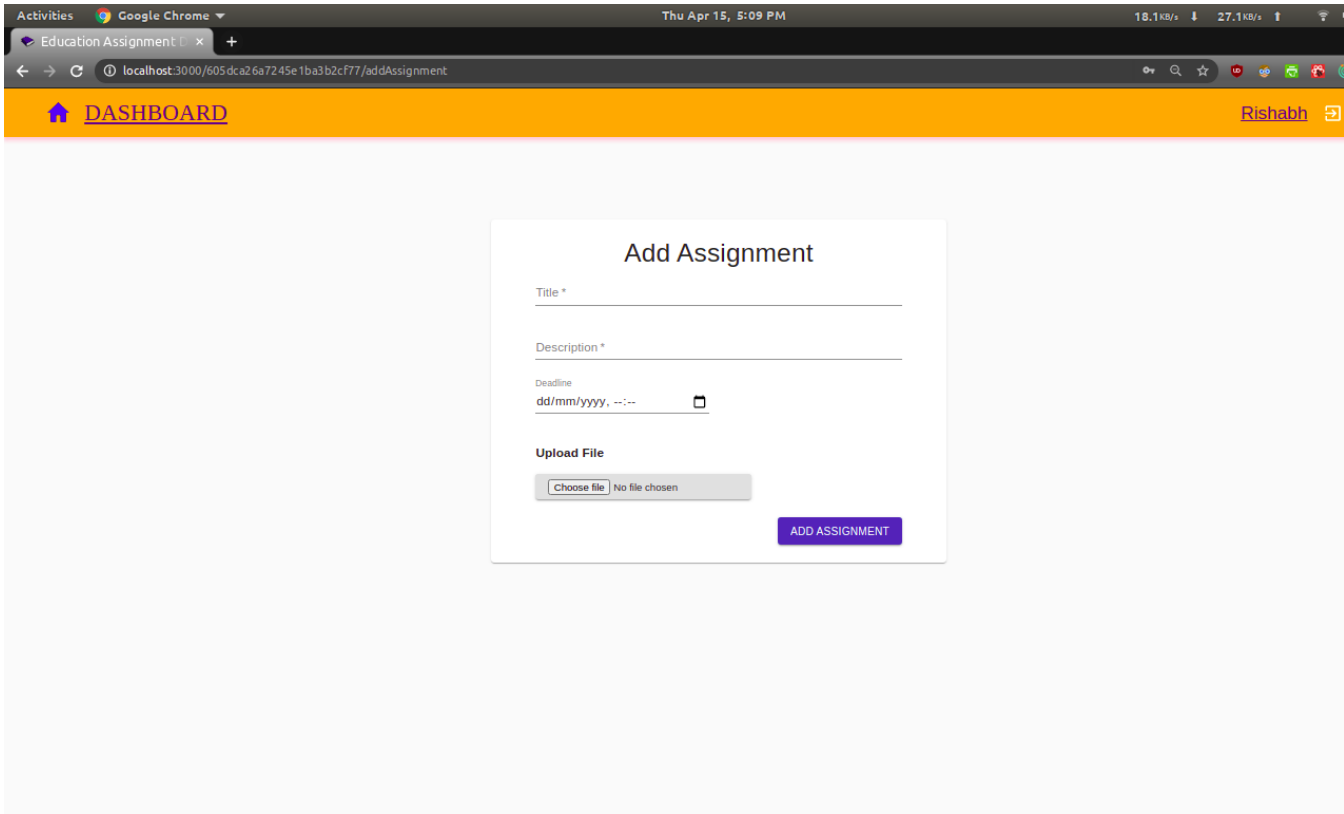
- Each student has been allotted an individual profile having unique user id and a password.



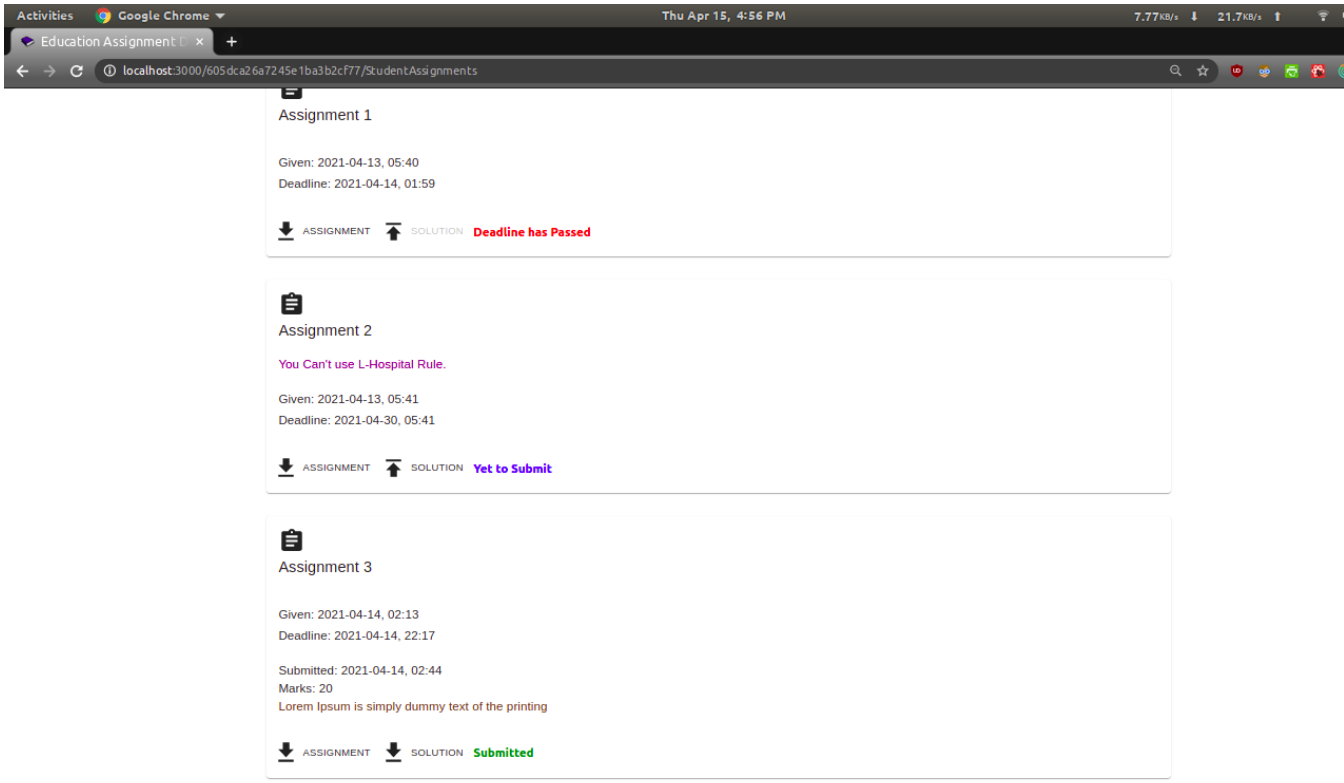
- Admin can add courses for the students which they are going to study in the upcoming semester.



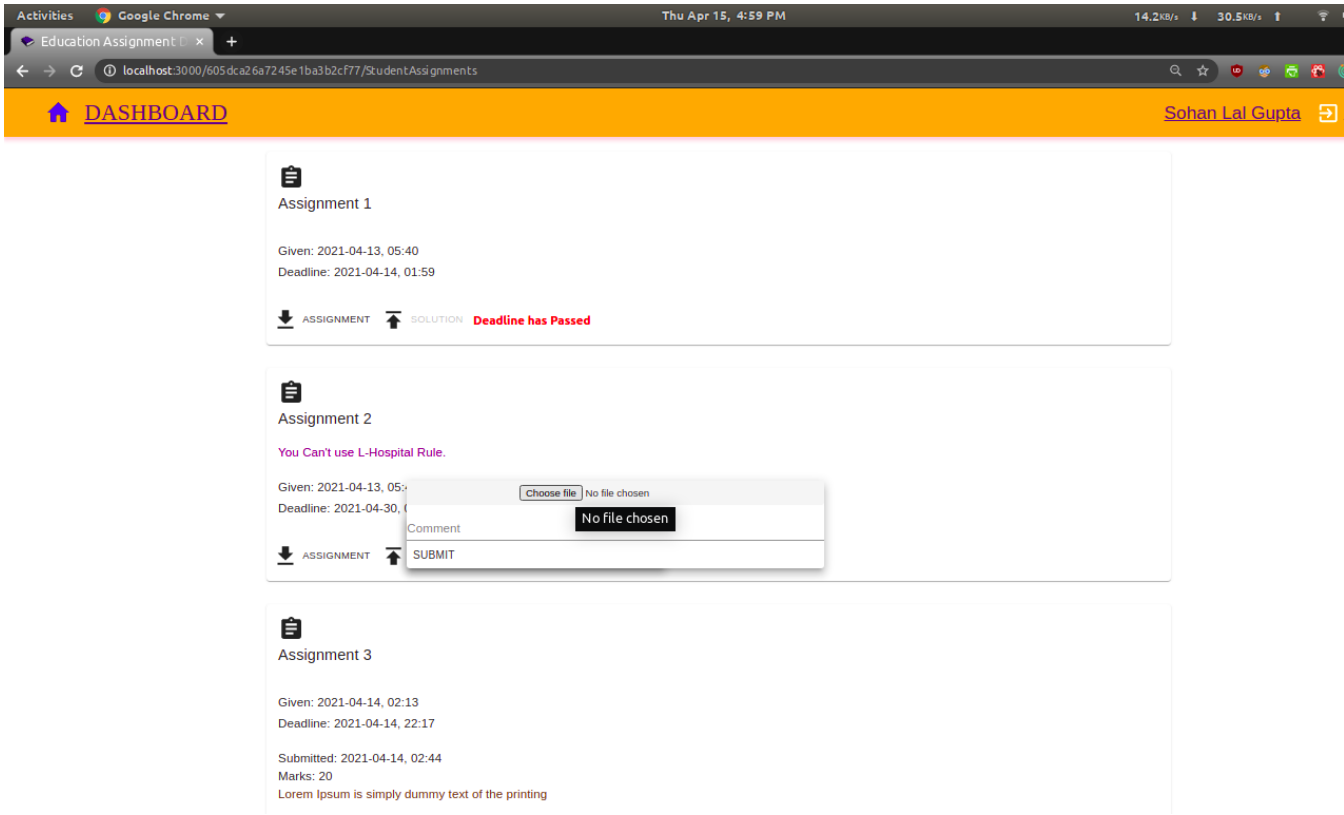
- Faculty would be able to upload and attach deadlines to assignments.



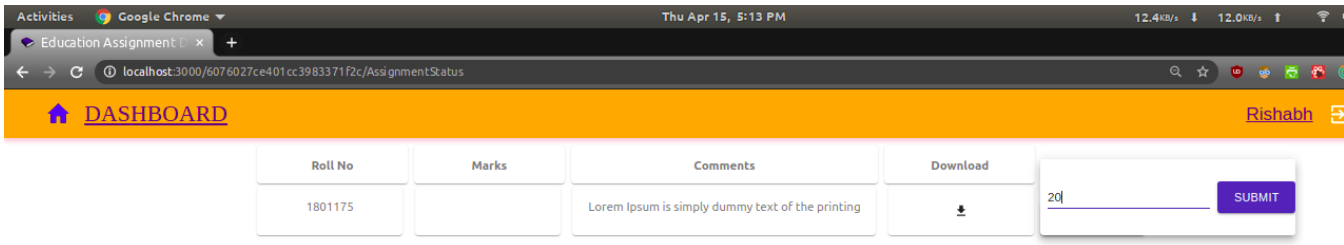
- An Assignment tracker keeps the students updated about all the pending assignments.



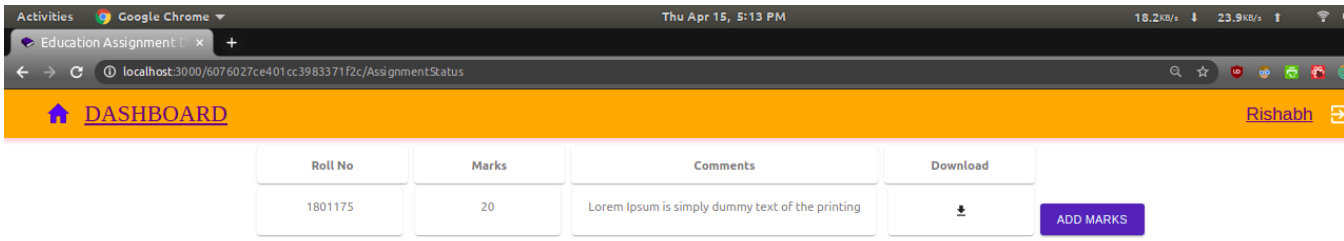
- Students can upload their assignments and only the concerned professors would be able to have a look at it.



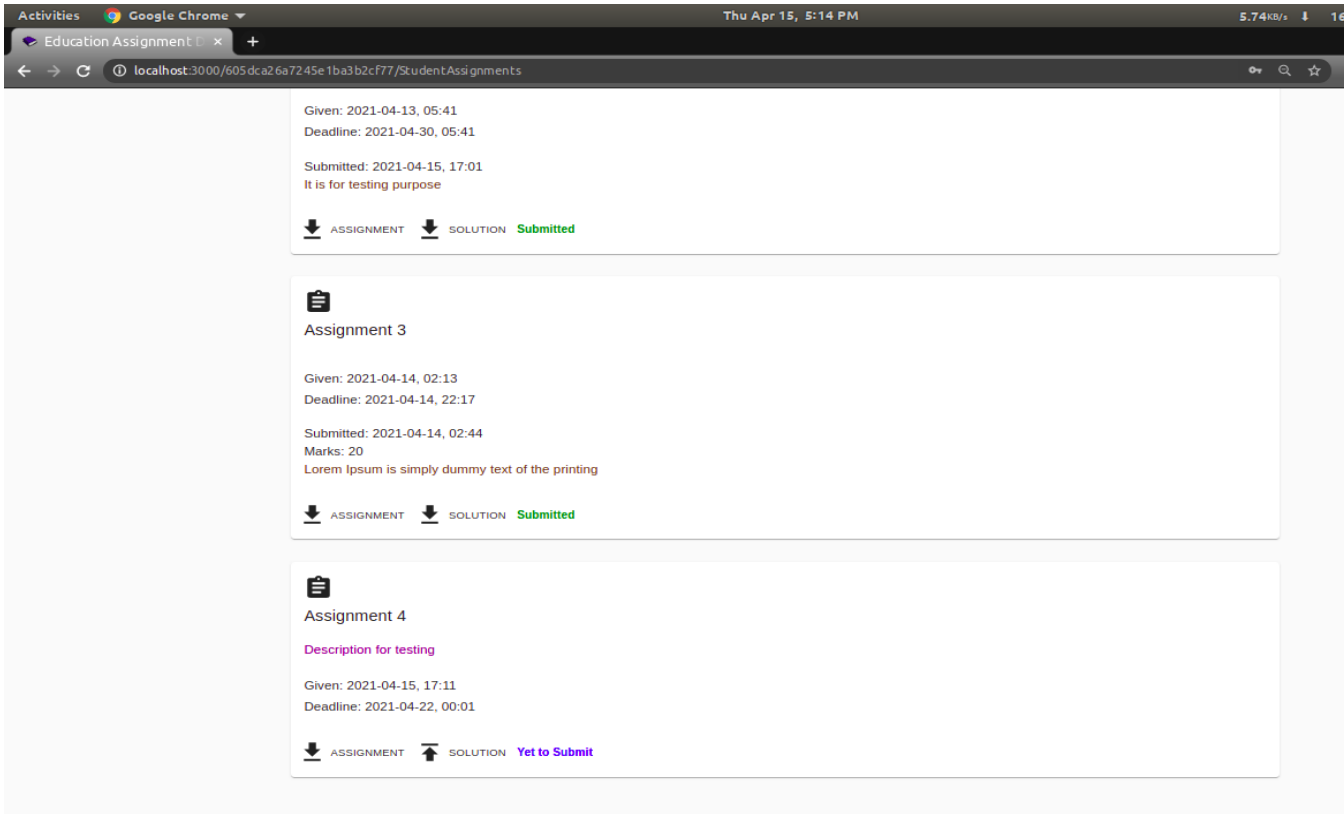
- The professors will be able to evaluate the assignments.



- After evaluation the marks would be allotted and stored in the dashboard itself.



- Students would be able to analyze their marks directly on the dashboard.



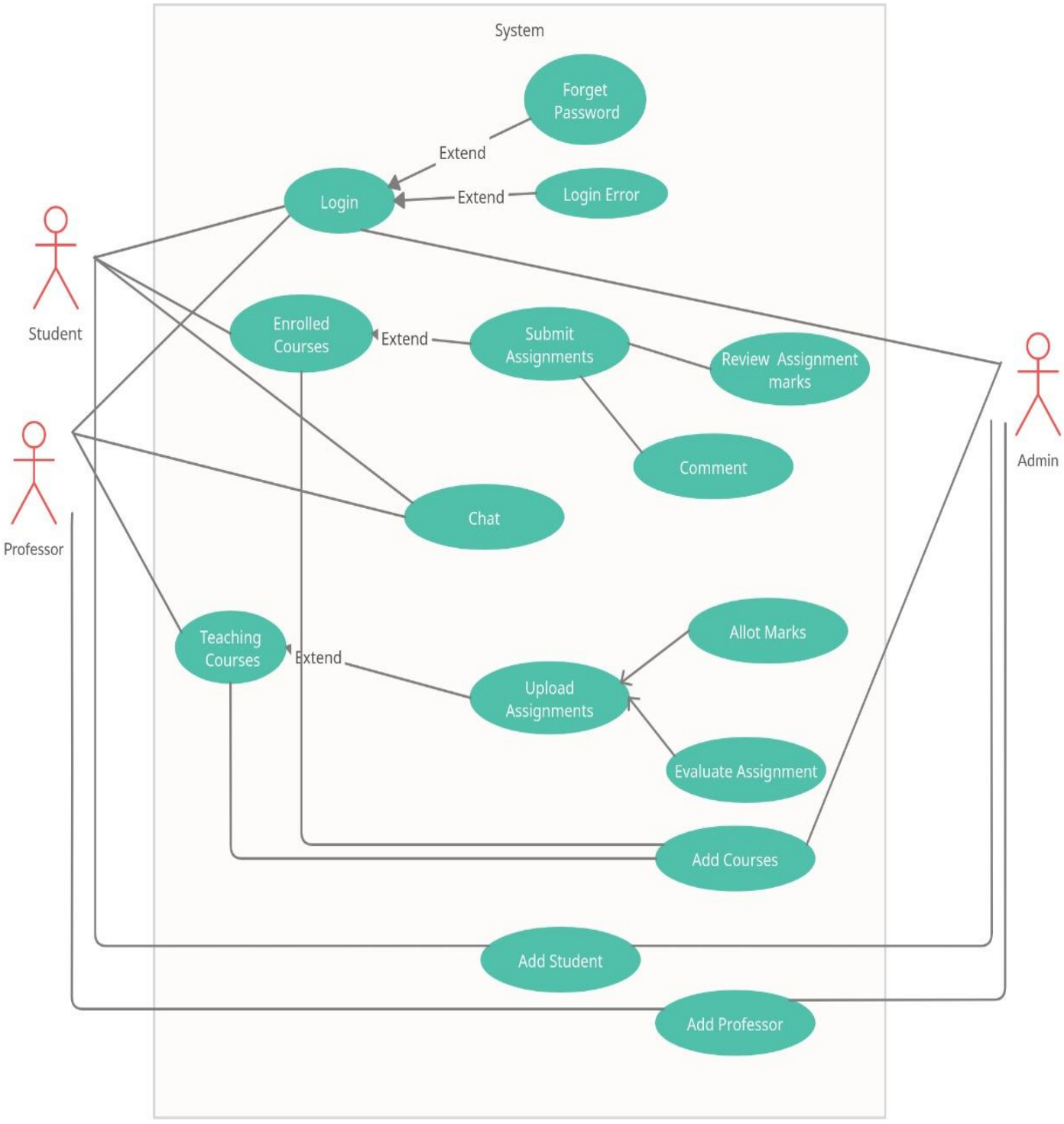
NON-FUNCTIONAL REQUIREMENTS-

Requirements that specify criteria that can be used to judge the operation of a system are called non-functional requirements. Non-functional requirements of our system are mentioned below:

- Secure access of confidential data (user's details).
- Better component design to get efficiency.
- The architecture would be flexible enough to extend or modify the features if required to do so in the future.

USE-CASE DIAGRAM

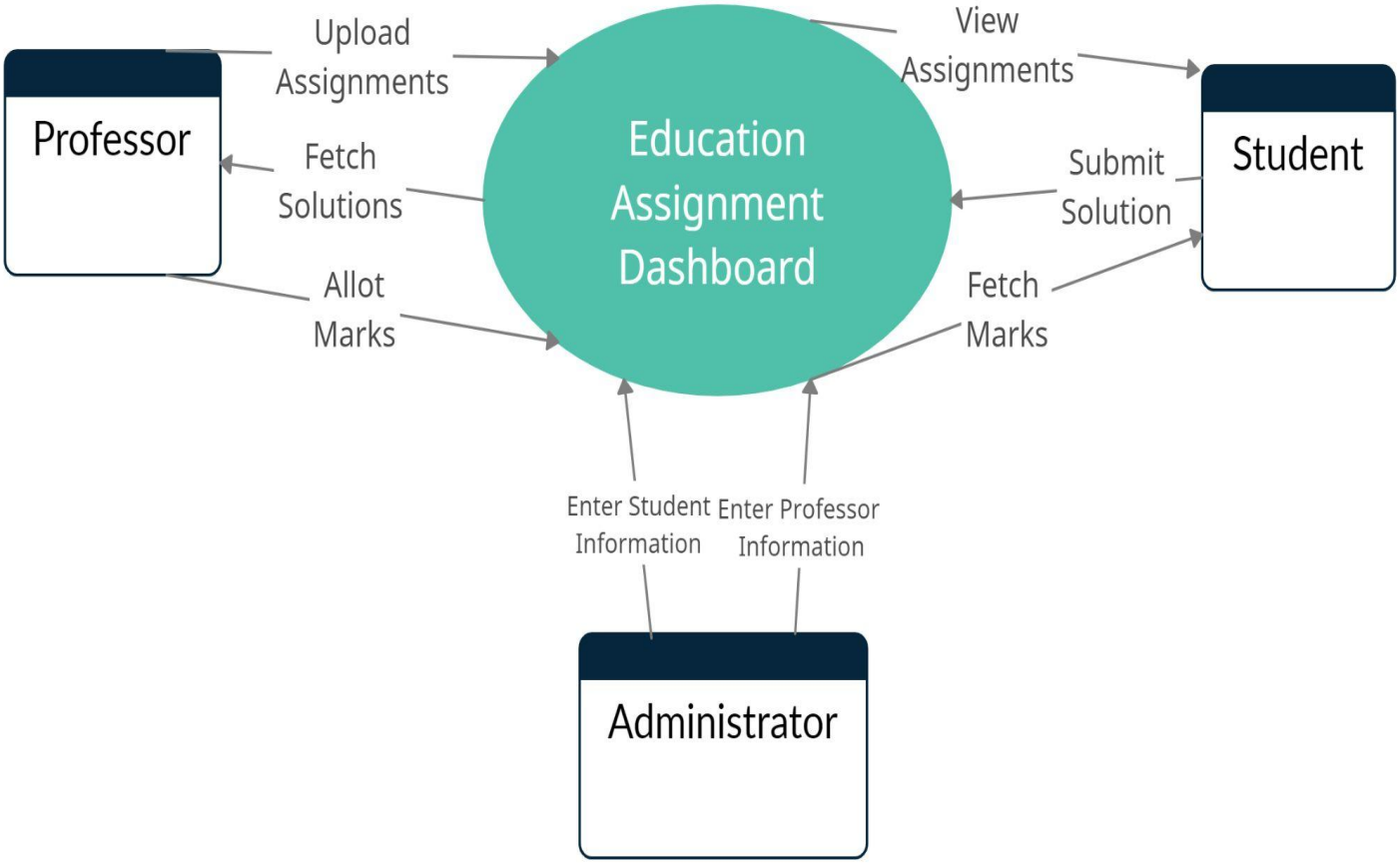
The use case diagram of our project is as follows-



DATA FLOW DIAGRAM-

We had made Level 0 as well as Level1 Data flow diagram-

i) Level 0 DFD

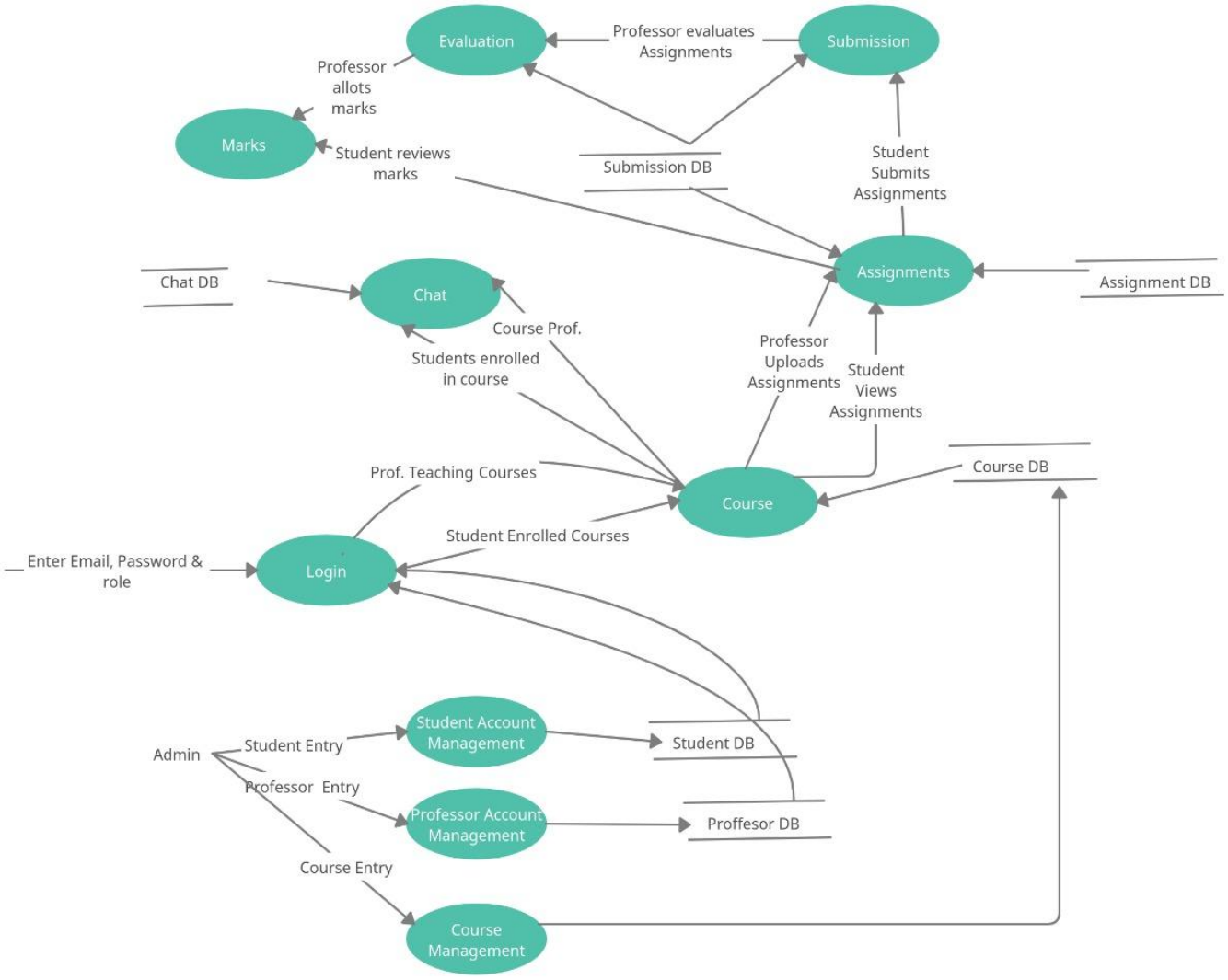


DFD Level 0 is also called a Context Diagram. It's a basic overview of the whole system or process being analyzed or modeled. It's designed to be an at-a-glance view, showing the system as a single high-level process, with its relationship to external entities.

Even though a Level 0 DFD seems to be pretty basic, it is of immense significance as it provides an overview of how the flow of data would happen in the project. But, beyond this we also have a Level 1 DFD that provides a detailed description of the flow of data between the various components of our project.

Hence, we also made a Level 1 DFD to highlight the data flow in a more comprehensive manner.

ii) Level 1 DFD -



A level 1 DFD notates each of the main sub-processes that together form the complete system.
It provides a more detailed view of the Context Level Diagram. Here, the main functions carried out by the system are highlighted as we break into its sub-processes.

IMPLEMENTATION-

The overview of the process of implementing our idea across the span of two months is mentioned below :-

a) Frontend - All the functionalities concerned with the frontend part of the project was completed using React.js . React is an open-source, front end, JavaScript library for building user interfaces or UI components. It is maintained by Facebook and a community of individual developers and companies. React can be used as a base in the development of single-page or mobile applications. The main reason behind using React for the purpose of Frontend development was because of the outright advantages that it possesses over the other tools available for developing the Frontend of any Web App. React basically gives developers the ability to work with a virtual browser that is more friendly than the real browser. The virtual browser of React acts like an agent between the developer and the real browser, hence substantially moderating the task of the developer. Further, To make sure that even small changes that take place in the child structures won't affect their parents, ReactJS uses only downward data flow. Changing an object, developers just modify its state, make changes, and, after that, only particular components will be updated. This structure of data binding ensures code stability and continuous app performance. Hence, it is user friendly and provides stable coding.
Over and above that,React provides component based design and material UI for beautiful interface.
We also used Redux for optimal state management, because if not redux - the no of API calls increases, hence there is less pressure on the backend. Redux allows us to manage the app's state in a single place and stores the changes in our app more predictable and traceable. It made it easier to reason about changes occurring in our app. But all of these benefits came with tradeoffs and constraints.
Hence, all these technologies were used by us in order to develop our Frontend.
Since ours was a Web app based project, it contained multiple web pages and all these web pages combined together constituted the Frontend of our project.

b) Backend - All the functionalities concerned with the backend part of the project were completed using Node.js . Node.js is an open-source, cross-platform, back-end JavaScript runtime environment that runs on the V8 engine and executes JavaScript code outside a web browser. The primary reason for preferring Node.js over other tools commonly used for developing backends was that Node.js complements React.js very well. Both Nodejs and React are javascript languages that can be executed on both client and server-side. Developers can execute the Reactjs code directly in the Node.js environment.The React DOM has components specifically designed to work with Nodejs that reduces the lines of code, making server-side rendering comparatively easy.

Moreover, Node.js uses a single threaded model combined with event looping that makes for a highly scalable server different from traditional servers like the Apache HTTP Server which create limited threads to handle a large number of requests. This single threaded model also prevents the server from responding in a non-blocking manner, since there are practically no functions in Node.js that directly perform I/O. Additionally, because they output the data in bulks, applications created with Node.js do not suffer from buffering.

Because of the compatibility between node.js and react.js, the integration of the frontend with the backend became a less complicated task.

c) Database- For maintaining the records in our Education assignment Dashboard, we created as many as six databases. The names of the databases and their essential functionalities were as follows-

i) Student - Contains all the vital information related to the students like their name, roll number, academic year, branch, and etc.

ii) Admin - Contains all the vital information related to the administration like their name, ID, and password.

iii) Teacher - Contains all the vital information related to the professors like their name, teacher id, course id, branch, email id, and password.

iv) Courses - Contains all the vital information related to the courses like their name, teacher id of the professor taking the course.

v) Assignment - Contains all the vital information related to the Assignment like their name, Assignment id, their upload date, the deadline, Course ID of the course to which the particular assignment belongs, and the assignment file.

vi) Submission - Contains all the vital information related to the Submission like the submission date, roll No of the students submitting the assignment, Assignment Id, Submission file, Marks,Course ID, and Teacher ID.

All the work related to the databases were done using MongoDB. MongoDB is a source-available cross-platform document-oriented database program. Classified as a NoSQL database program, MongoDB uses JSON-like documents with optional schemas. MongoDB is developed by MongoDB Inc. and licensed under the Server Side Public License. The main reasons for using MongoDB are as

stated down below.

MongoDB is a schema-less database. This means that we can have any type of data in a separate document. This feature gave us flexibility and a freedom to store data of different types. Also, We can store a large amount of data by distributing it to several servers connected to the application. If a server cannot handle such big data then there won't be any failure condition. Apart from this, MongoDB is a document-oriented database. It is easy to access documents by indexing. Hence, it provides a fast query response. Furthermore, It is easier to set up MongoDB than RDBMS. It also provides a JavaScript client for queries.

Hence, by using MongoDB as the database, we were able to provide a reliable and efficient source for storing and handling all the data related to our Education Assignment Dashboard.

MODEL OF THE PROJECT

We followed the **WATERFALL MODEL** as the prototype for our project.

The Waterfall model is the earliest SDLC approach that was used for software development. The waterfall Model illustrates the software development process in a linear sequential flow. This means that any phase in the development process begins only if the previous phase is complete. In this waterfall model, the phases do not overlap.

All these phases are cascaded to each other in which progress is seen as flowing steadily downwards (like a waterfall) through the phases. The next phase is started only after the defined set of goals are achieved for the previous phase and it is signed off, so the name "Waterfall Model". In this model, phases do not overlap.

The major reason why we choose to go ahead with this model was because it allows for apportionment and control. By following this model, we could schedule all our work beforehand and we were able to set deadlines for each stage of development and the product proceeded through the development process model phases one by one.

Development of the project moved from planning, through design, implementation, testing, installation, troubleshooting, and ended up at operation and maintenance. Each phase of development proceeded in strict order.

Since the process was simple and methodical, it payed immense dividence and we are able to finish our

project within the stipulated time and to the best of our efforts.

OVERVIEW

Combining the frontend, backend, and the databases we proceeded towards the implementation of our project. We created three essential roles, Student, Professor and Administrator. All the three of them have their unique login id and password and need to login using that only. After logging in the functionality of each individual actor is as follows:-

a) Professors - They have been assigned with the task of uploading the assignments with a deadline decided by them in the course taught by them. They are given a field wherein they can upload the file containing the assignment question. They can also edit the question at a later stage if they feel that there is some need for changes. Once, the students have submitted the assignments, then the professor can check the assignment of each and every student individually and allot marks on the dashboard itself.

b) Student - After the professor uploads the assignments, it is the duty of the students to submit it within the stipulated time. The students have been provided with the facility of keeping a tab on all the assignments across all the courses. They need to upload the file containing the solution before the deadline. After this, once the professor assigns marks to each and every student, they can view the marks that they managed to get in the assignments.

c) Administrator - Their role is to assign appropriate professors to their scheduled courses and the appropriate students to the courses they will study. The admin incorporates the changes in the dashboard with the help of an excel sheet which will contain the details of the students, professors,and the courses beforehand.

TESTING

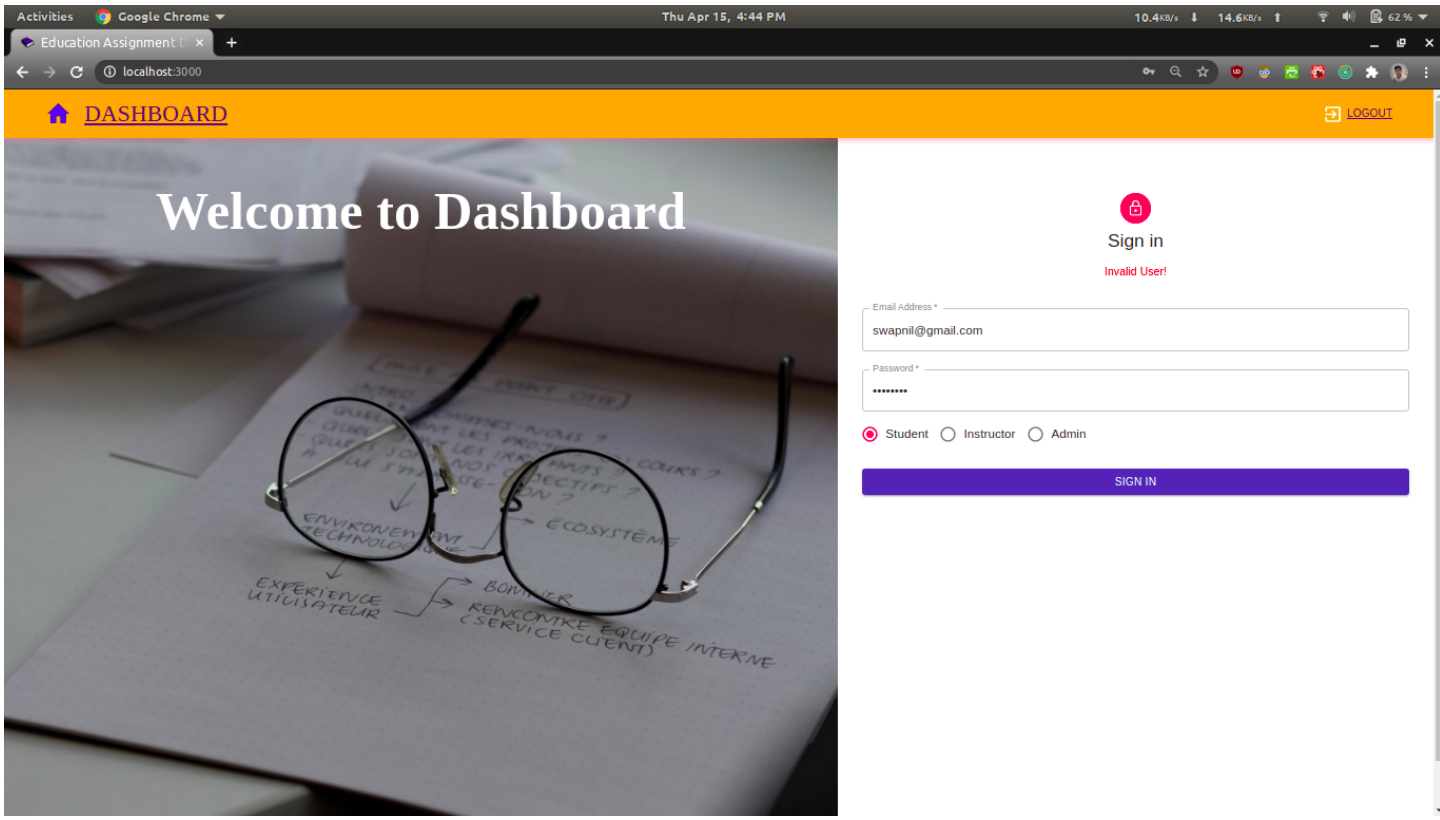
A clear strategy for software testing provided a road map that described the steps to be conducted as part of testing, when these steps were planned and then undertaken, and how much effort, time, and resources will be required. Therefore, any testing strategy must include the features such as test planning, test case design, test

execution, and resultant data collection and evaluation. At the same time, it must be rigid enough to encourage reasonable planning and management tracking as the project progresses. Testing is a set of activities that can be planned in advance and conducted systematically. A strategy for software testing must accommodate low-level tests that are necessary to verify that a small source code segment has been correctly implemented as well as high-level tests that validate major system functions against customer requirements. A strategy should provide guidance for the practitioner and a set of milestones for the manager. Because the steps of the test strategy occur at a time when deadline pressure begins to rise, progress must be measurable and problems should surface as early as possible.

We performed the testing wherein, in the first case we entered a wrong user id and in the second case, we entered the correct user id but the wrong password and in the third case, we gave the right credentials for both the fields.

The results were as follows

i)



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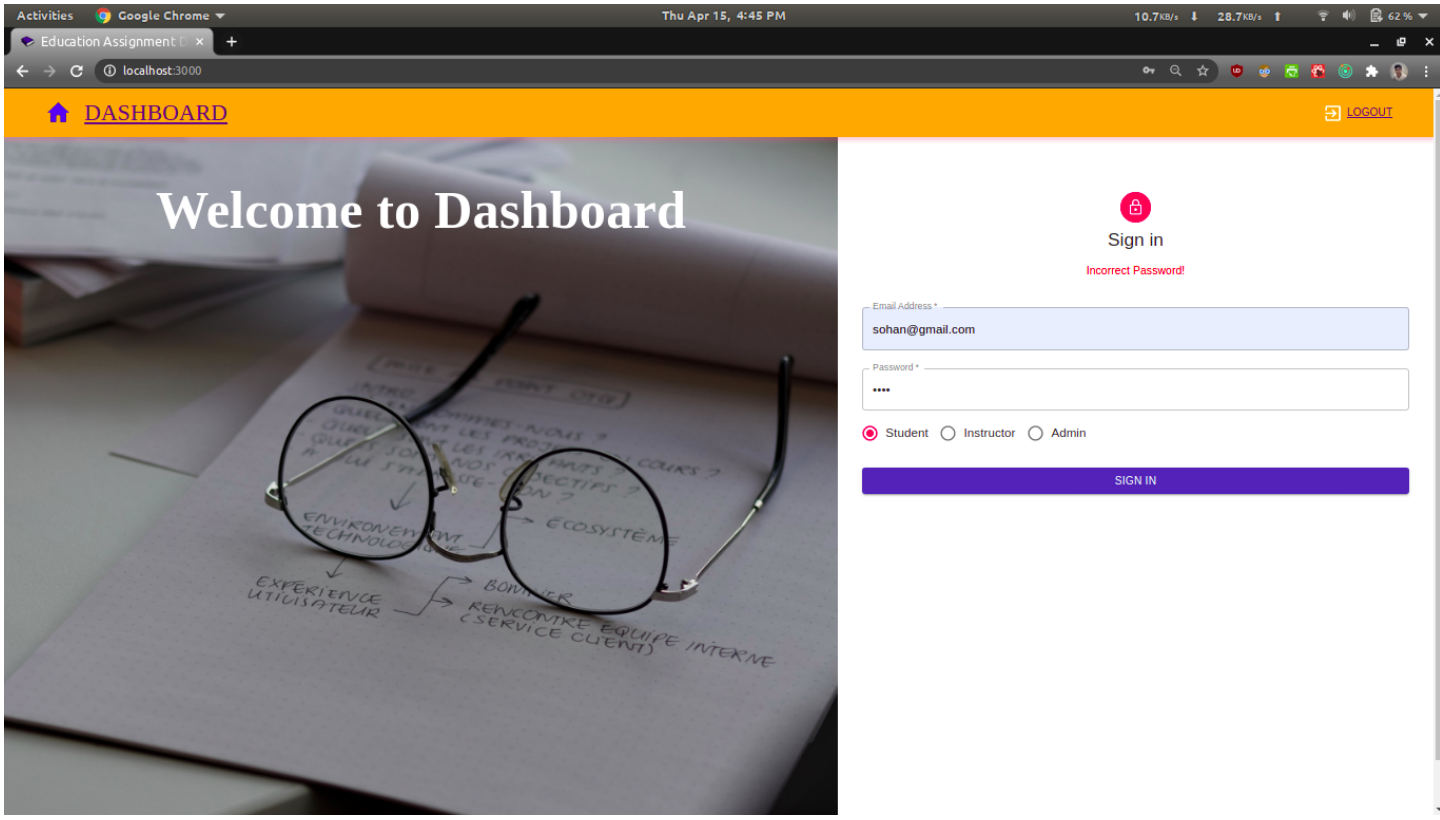
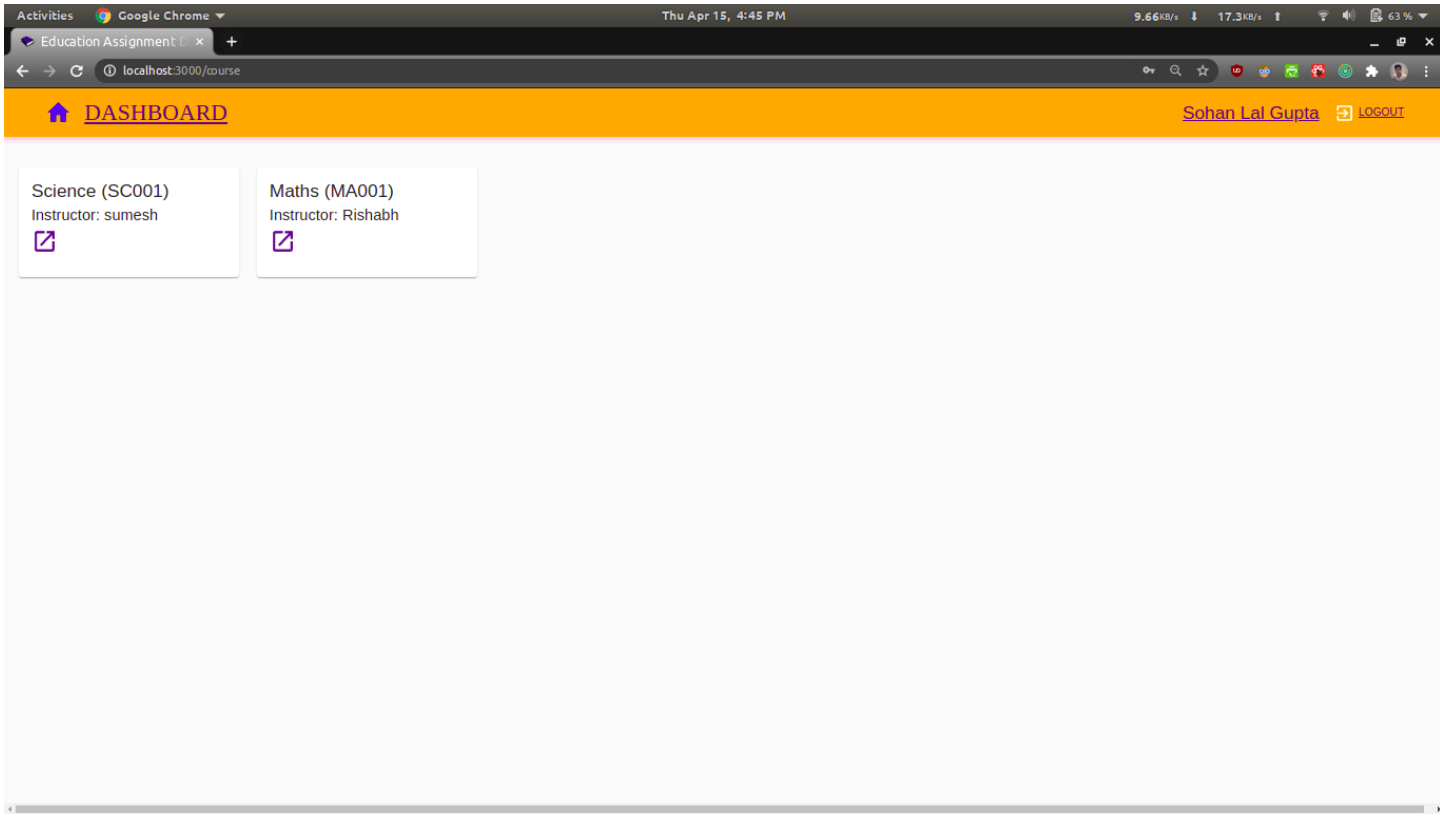

Activities
Google Chrome
Thu Apr 15, 4:45 PM
Education Assignment
localhost:3000
DASHBOARD
LOGOUT
Welcome to Dashboard
Sign in
Incorrect Password!
Email Address *
sohan@gmail.com
Password *
Student
Instructor
Admin
SIGN IN

iii)



In all the three cases, the outputs were as we had expected them to be and hence our testing was successful.

CONCLUSION

The purpose of undertaking this project, apart from the obvious Academic necessity, was to provide the institute with an integrated web app to deal with all the problems associated with Assignments. Having been associated with the institute for almost three years, We proceeded with the vision of providing an immediate solution to the problem of Assignment submission and evaluation, that persists in our college.

Every project, be it on either small or large scale, acts as a huge learning curve for the students. But, this particular project, wherein the group members were to do everything, right from the scratch, turned out to be immensely productive. Since we were also required to identify even the topic of our project on our own, we learnt the art of decoding those problems that affect us in our day to day life.

The evolvement in our technical skills was pretty evident to witness as we came across many new non-theoretic

problems which most of us had never come across in their entire lives.

Since the idea was to identify effective strategies for dealing with the problem which persists in our own institute, we also took valuable inputs from the fellow students of our batch in order to understand their perspective regarding the extent of the problem at hand. Nothing would have been possible without the extensive support of our faculty and the TA members who taught this course, their suggestions and analysis regarding our work was invaluable. So, all the three members of the group would like to thank all those people who helped us from the bottom of our hearts. This project wouldn't have been possible without you.

Based on the analysis conveyed, and the solution that we have proposed, we believe that we have provided a web app that is good enough to be incorporated as a part and parcel of our institute.

FUTURE WORKS

Future exploration into this particular aspect involves the integration of our Assignment dashboard with the result portal that the members of some other group had proposed to make. Since, ours is a very flexible web app, any changes that the institute may desire in the future shall be duly brought into place.